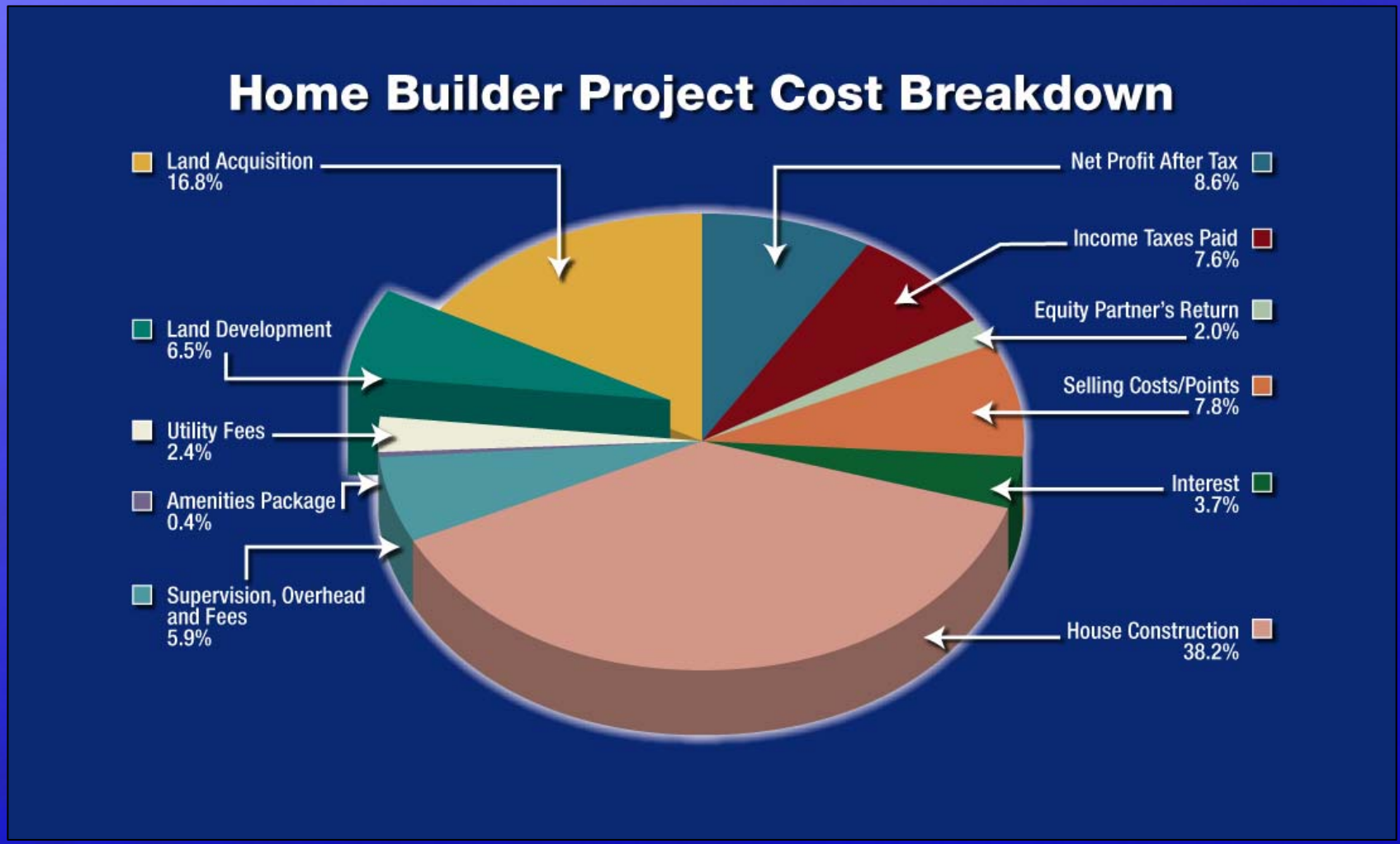
Taking The Mystery Out of Wastewater Economics

The 4-Component Model

Why Understand Wastewater Systems?

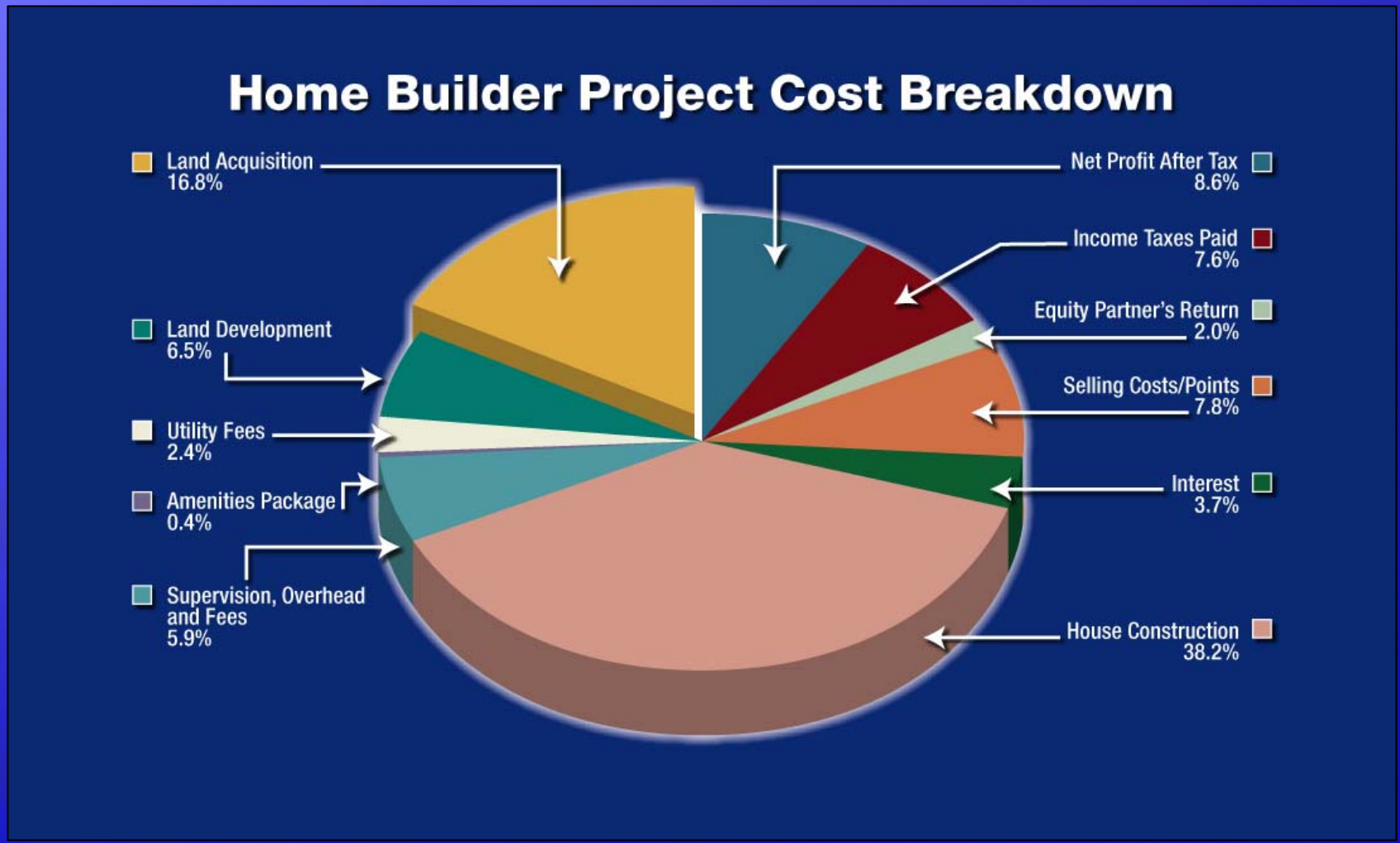


Wastewater: The Bigger Cost

Choice of wastewater treatment technology can affect the developer's ability to acquire developable land

- Dr Horton: Pacific Coast Builders Conference, 2004
  - ~ Major homebuilders seeking 7-8 years of land inventory
  - ~ Buying larger parcels at greater distances from municipalities
  - ~ 2004 – land acquisition of $93M – largest in their history
  - ~ Three land deals, even larger, under construction
- Lands near wastewater infrastructure reaching build out
- Wastewater infrastructure shortfall in US: ~$440 billion

Why Understand Wastewater Systems?



Impact of WWS Decisions

- Some WWS technologies allow developers to ...
  - ~ Build on land that has no access to a public WWS
  - ~ Buy significantly less expensive land
  - ~ Build where the existing WWS is “maxed out” or “too far away”
  - ~ Avoid excessive system development charges
  - ~ Increase lot density
  - ~ Expand WWS capacity along with build out

The Four Components of Any WWS

- **On-Lot**
  - ~ Equipment and piping installed on each property that holds and transports wastewater to the property boundary
- **Collection**
  - ~ Network of piping that transports wastewater from all property boundaries to the community treatment facility
- **Treatment**
  - ~ Facility and process used to reduce or remove constituents (or impurities) in wastewater to a level at which it can be released into the environment
- **Dispersal**
  - ~ Method and equipment by which treated waste is released into the environment

Example: WWS for The Briar Rose

Golf and equestrian community

- ~ Approx. 425 units; 4 phases
- ~ Rural central Georgia

- **On-Lot:** STEP package – tank, pumping system, control panel
- **Collection:** Small diameter PVC piping; constant depth
- **Treatment:** AdvanTex® textile; treatment capacity is added as the homes are developed
- **Dispersal:** Disinfection and then used for golf course irrigation

Cost Estimate: The Briar Rose

Briar Rose Decentralized Wastewater System: Summary Cost Estimates

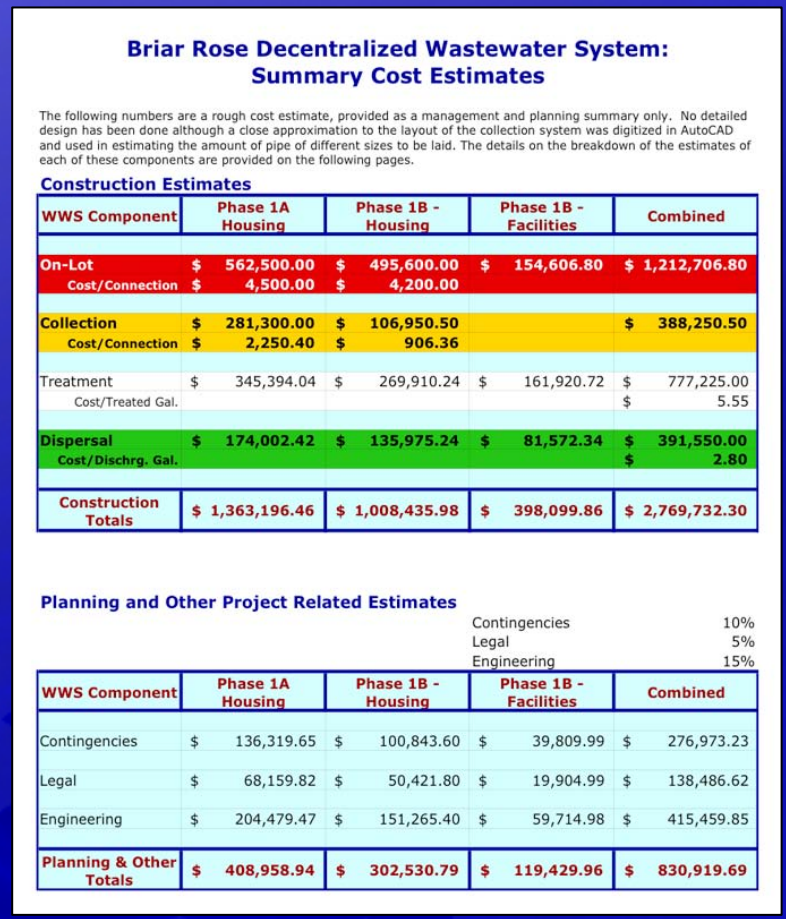
Construction Estimates

WWS Component	Phase 1A Housing	Phase 1B - Housing	Phase 1B - Facilities	Combined
On-Lot	$ 562,500.00	$ 495,600.00	$ 154,606.80	$ 1,212,706.80
Cost/Connection	$ 4,500.00	$ 4,200.00		
Collection	$ 281,300.00	$ 106,950.50		$ 388,250.50
Cost/Connection	$ 2,250.40	$ 906.36		
Treatment	$ 345,394.04	$ 269,910.24	$ 161,920.72	$ 777,225.00
Cost/Treated Gal.				$ 5.55
Dispersal	$ 174,002.42	$ 135,975.24	$ 81,572.34	$ 391,550.00
Cost/Dischrg. Gal.				$ 2.80
Construction Totals	$ 1,363,196.46	$ 1,008,435.98	$ 398,099.86	$ 2,769,732.30

Cost Estimate: Full Summary Page

Fully constructed cost estimate

Engineering and other cost estimates



Briar Rose Decentralized Wastewater System: Summary Cost Estimates

The following numbers are a rough cost estimate, provided as a management and planning summary only. No detailed design has been done although a close approximation to the layout of the collection system was digitized in AutoCAD and used in estimating the amount of pipe of different sizes to be laid. The details on the breakdown of the estimates of each of these components are provided on the following pages.

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Planning and Other Project Related Estimates

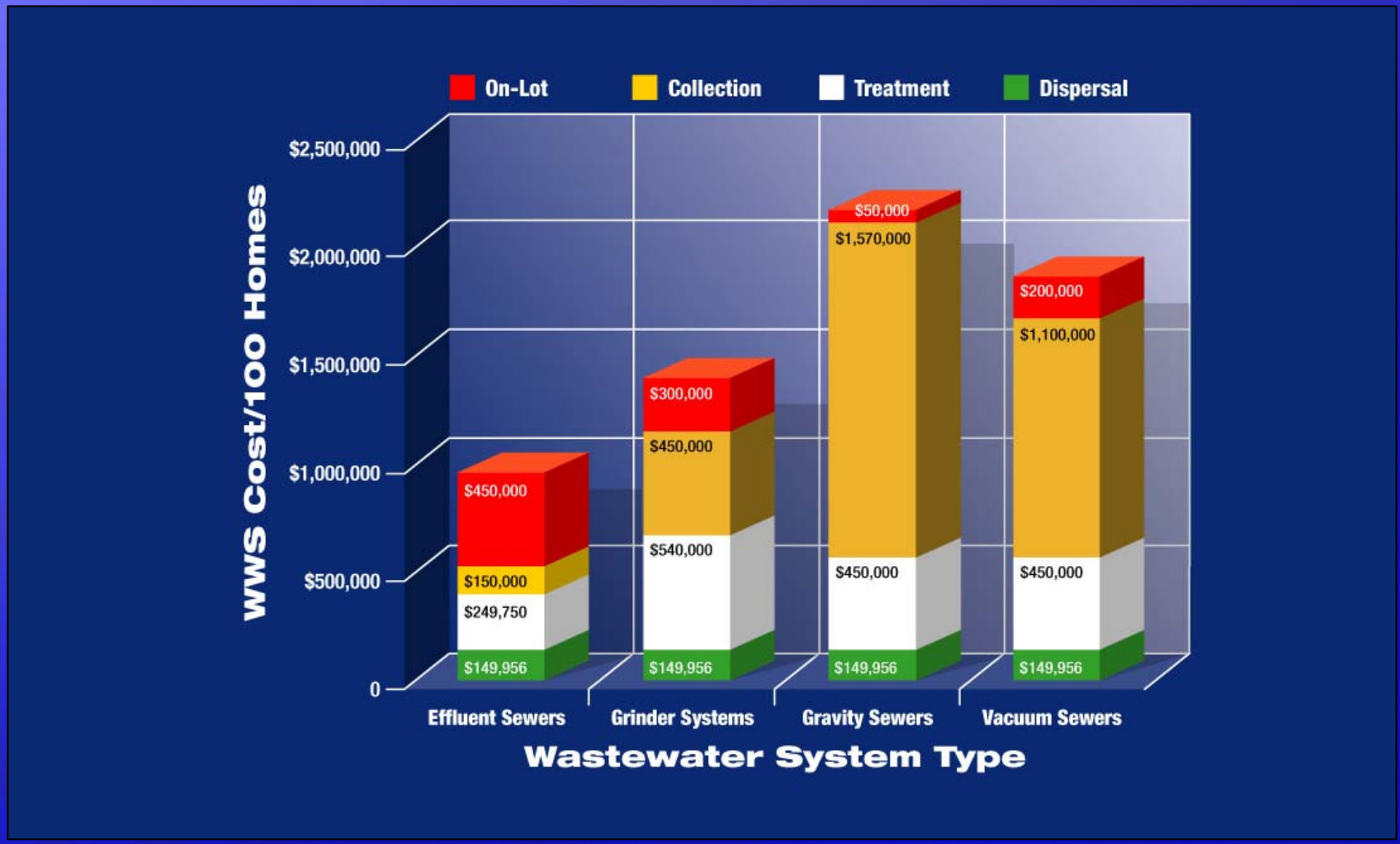
Contingencies	10%
Legal	5%
Engineering	15%

WWS Component	Phase 1A Housing	Phase 1B - Housing	Phase 1B - Facilities	Combined
Contingencies	$ 136,319.65	$ 100,843.60	$ 39,809.99	$ 276,973.23
Legal	$ 68,159.82	$ 50,421.80	$ 19,904.99	$ 138,486.62
Engineering	$ 204,479.47	$ 151,265.40	$ 59,714.98	$ 415,459.85
Planning & Other Totals	$ 408,958.94	$ 302,530.79	$ 119,429.96	$ 830,919.69

Importance of Component Cost Breakdowns

- Allows developers to compare and evaluate two or more proposed wastewater systems
- Allows developers to ask questions about technology options and costs for specific components of the system
- Allows developers to evaluate and compare costs for contingencies, engineering and legal fees

Wastewater System Cost Comparisons

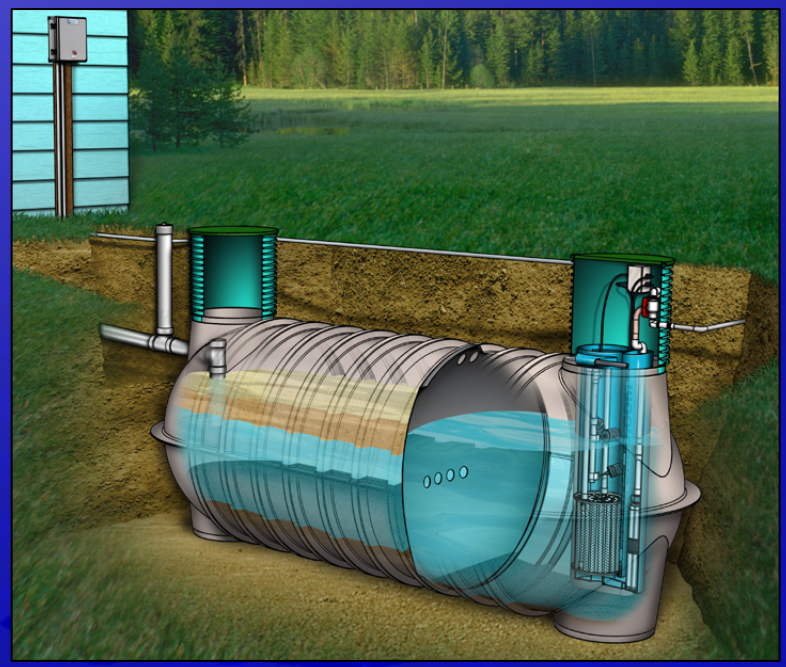


Orenco Technology and Wastewater Systems

- **On-Lot:** Orenco STEP package
- **Collection:** Small diameter PVC; shallow burial
- **Treatment:** AdvanTex® textile treatment system
- **Dispersal:** Same options as other technologies

On-Lot
ProSTEP™ Effluent Pumping Systems

- Watertight tank
- Biotube® pump vault
- High-head effluent pump
- Control panel
- Splice box
- Float assembly
- Discharge assembly
- Risers, lids



On-Lot
VeriComm® Control Panels

- VeriComm allows for 24/7 supervision with remote monitoring
- Web-based monitoring
- E-mail notification to O&M providers in case of alarms
- Operation and maintenance is simplified

Collection

Orenco Effluent Sewer

- Small diameter lines
- Shallow bury
- Follows contour of land
- Pressurized
- Watertight

Treatment

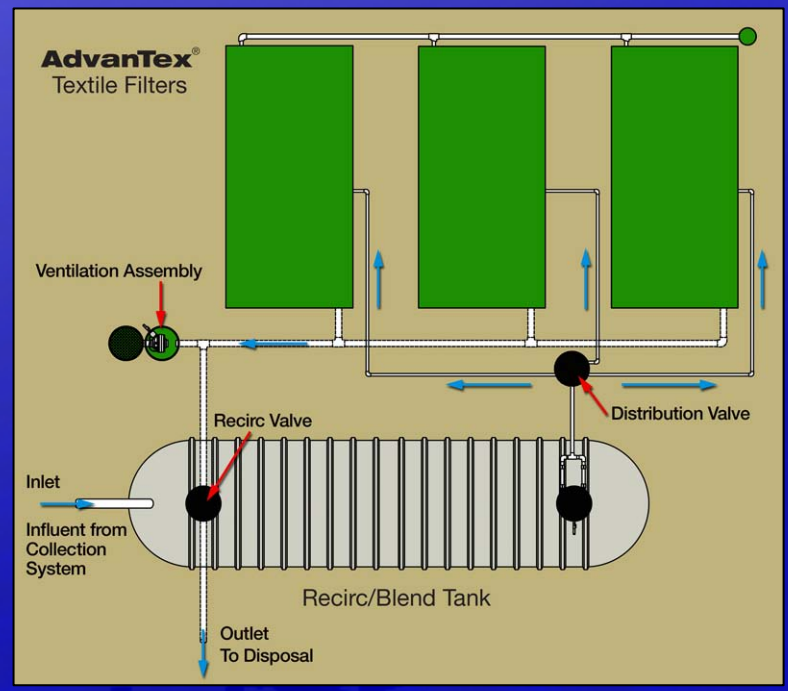
Commercial AdvanTex® ... AX100

- Physical specifications
  - ~ 16' x 8' x 3.5'
  - ~ Footprint: ~128 sq. ft.
  - ~ Dry weight: ~1650 lbs.
- Treatment capacity
  - ~ Design flow: 5000 gpd

Treatment Configuration – Small

- Design: 15,000 gpd
- Capacity: 34 homes

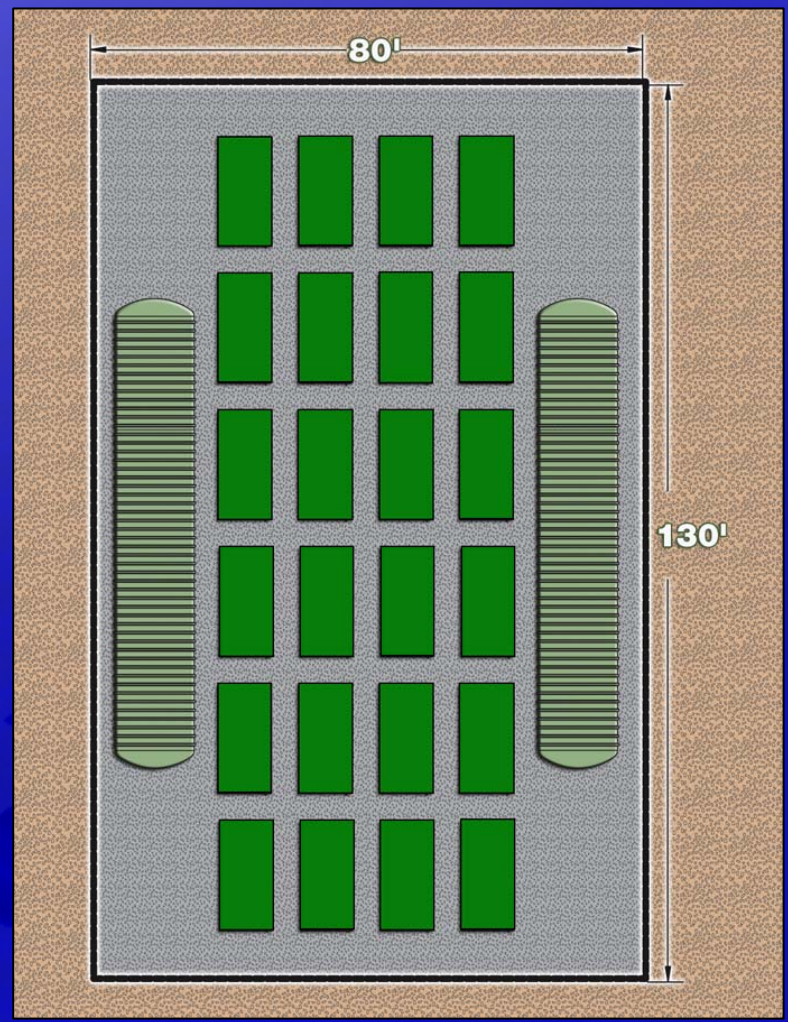
From collection system



To dispersal

Treatment Configuration – Large

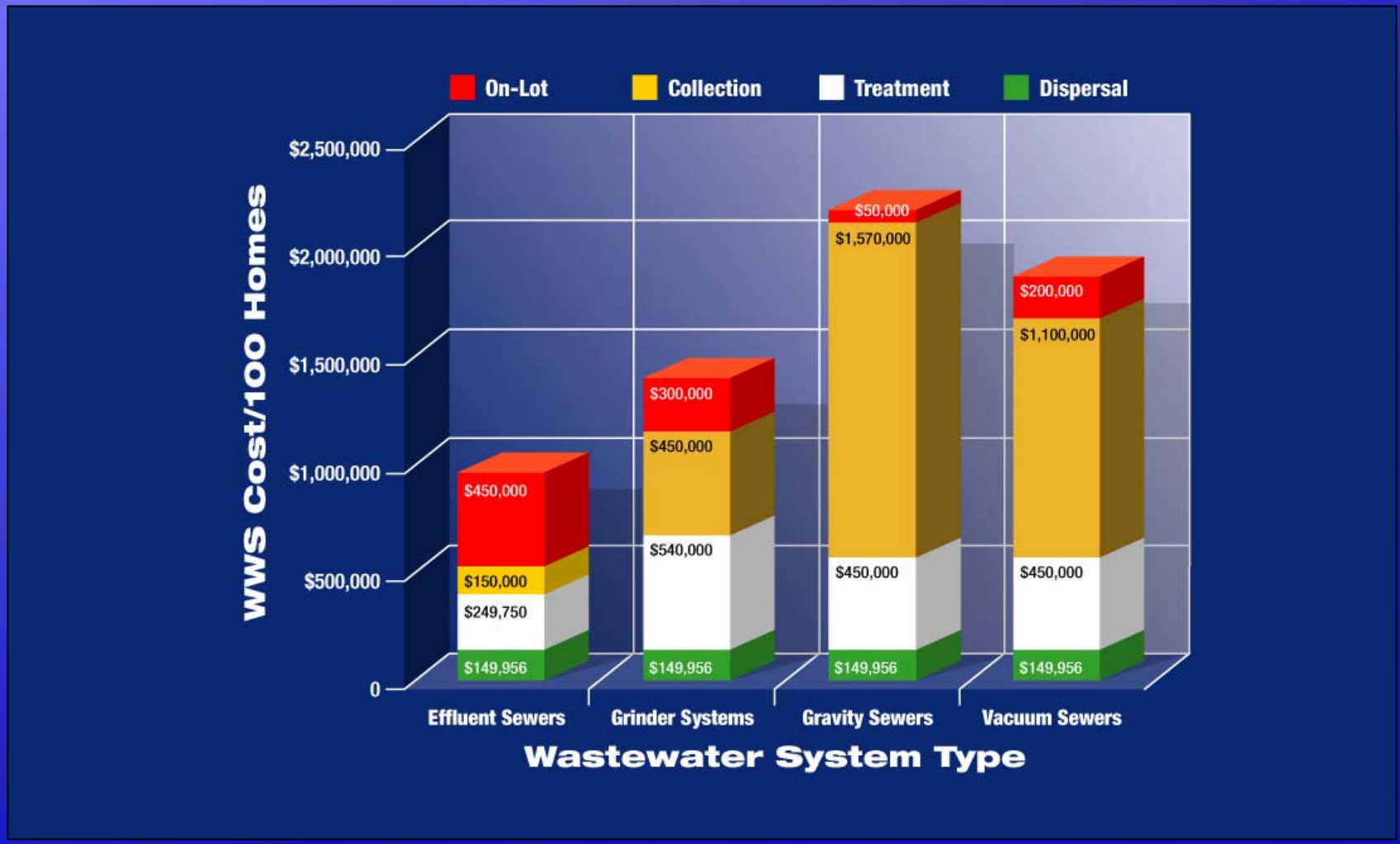
- Design: 120,000 gpd
- Size: 1/4 acre
- Capacity: 300 homes
- Approximate cost: $650,000
- Construction time: 2-3 weeks



Cost Staging
Minimizing Upfront Capital Expenditures

- **On-Lot (45%):** Orenco STEP package
  - ~ **Deferred** cost – paid for by homebuilder/homeowner
- **Collection (15%):** Small diameter PVC; buried shallowly
  - ~ **Upfront** cost – paid for by land developer
- **Treatment(27%):** AdvanTex®; expanded incrementally
  - ~ **Upfront** cost – 25% of treatment equipment installed initially
  - ~ **Delayed** cost – remaining 75% of treatment equipment installation in 3 stages, as project is built out
- **Dispersal (13%):** Onsite; expanded incrementally
  - ~ **Upfront** cost – 50% of dispersal installed initially
  - ~ **Delayed** cost – 50% of dispersal installed at approximately one-half of buildout

Wastewater System Cost Comparisons



Wastewater Service Needs of the Land Development Process

- Land acquisition
  - ~ Consulting and advice on WW options
- Land use planning
  - ~ WW technology recommendations
  - ~ Cost estimating and economic analysis
  - ~ Zoning and entitlement process support
- Project design
  - ~ WW engineering and design
  - ~ Regulatory process support

Wastewater Service Needs of the Land Development Process

- Project construction
  - ~ WW equipment sales
  - ~ WW equipment installation
- Development lifetime
  - ~ WW system ownership and management
  - ~ WW operations and maintenance

Summary and Conclusion

- There are WWS options that can allow land development ...
  - ~ Where there is no access to local WW infrastructure
  - ~ Where conventional WW solutions will not reach
  - ~ When system development charges have become excessive
- The simple 4-component model is useful for understanding WWS technology, economics and making decisions
- Choices of what technology to use on one component limit or determine your choices (and costs) on other components
- Understanding of WWS technology and economics can have significant impact on decisions made throughout the land development process

Solutions for Decentralized Wastewater Treatment

Orenco Systems®, Inc.

www.orenco.com